Title Effect of biocontrol agent *Bacillus amyloliquefaciens* and 1-methyl cyclopropene on the control of postharvest diseases and maintenance of fruit quality

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Citation Crop Protection, Volume 30, Issue 2, February 2011, Pages 173-178

Keywords *Carica papaya*; Anthracnose; Phomopsis soft rot; 1-MCP; Antagonist; Fruit decay

Abstract

Efficacy of biocontrol agent *Bacillus amyloliquefaciens* PPCB004 was evaluated on the control of anthracnose and phomopsis rot in 'Solo' papaya pre-treated with 1-methyl cyclopropene (100 μl) (1-MCP) during storage. This treatment was compared to the untreated control, commercial treatment (washing in chlorinated water), stand alone 1-MCP and PPCB004 treatment. Although fruit pre-treated with 1-MCP delayed the ripening (100% yellow) after cold storage by 9–10 d, it showed higher incidence and severity of anthracnose and phomopsis rot than the fruit subjected to commercial treatment. Application of PPCB004 after 1-MCP pre-treatment (1-MCP + PPCB004) reduced the anthracnose and phomopsis incidence and severity after cold storage (10 °C, 85% RH for 14 d) and ripening at 25 °C. The 1-MCP + PPCB004 treatment helped to retain the fruit firmness, overall quality and uniform yellow skin (100%) and flesh colour after ripening. The PPCB004 was effectively recovered from stand alone PPCB004 and 1-MCP + PPCB004 treated fruit after cold storage and ripening. The PPCB004 population showed an increase by 1 log units after ripening in 1-MCP + PPCB004 treated fruit. After ripening the recovery of PPCB004 population was higher (0.7 log units) in 1-MCP + PPCB004. The total recovery of fungal population on the fruit surface after ripening was lower in 1-MCP + PPCB004 and stand alone PPCB004 treated fruit. It can be concluded that application of *B. amyloliquefaciens* PPCB004 with 1-MCP pre-treated papaya (at 25–30% skin yellow stage) can significantly reduce disease incidence associated with 1-MCP treatment. This treatment has the potential for commercial application in the 'organic' papaya industry.